

# Cemented Systems

PVC-U System  
PVC-C System  
ABS System

Universal use, excellent chemical resistance, easy to install

Metric and british standard range



# Solutions for any challenge

**Cemented systems are qualified for universal usage in highly diverse industrial applications.**

For safe, reliable and cost effective treatment and distribution of water and chemicals, GF Piping Systems has a comprehensive cemented system portfolio, which includes corresponding jointing technologies, fittings, valves, sensors, pipes and related tools as well as services. The PVC-U range of GF Piping Systems, which has been leading the industry for decades through continuous innovation and proven benefits on safety, efficiency and reliability, covers all aspects required to build, maintain and operate industrial piping systems.

## + Main benefits

- Safety** = **System lifetime warranty \***
- Simplicity** = **Simple installation with low costs for tools**
- Efficiency** = **Excellent price-performance ratio**
- Environment** = **Low carbon & water footprint**

\* Detailed information regarding the warranty can be found under: [www.gfps.com](http://www.gfps.com) - Planning Fundamentals

## + Everything from one source – From the planning stage to installation

Cemented systems are ideally adapted to customer needs.

We offer our customers not only reliable and innovative products, we supply tailor-made solutions from one source, which generate assurance for our customers. With a comprehensive system solution, GF Piping Systems provides the right fit and quality for many industrial applications and projects worldwide. The diversity of pipes, fittings, valves, jointing as well as automation technologies in the cemented systems portfolio is as diverse as our customers and their individual challenges.

### Customizing

The focus of our global customizing teams is manufacturing custom parts for special systems. Standardized processes warrant the highest level of quality.

### Technical support

Technical support and material selection are key factors for a successful installation. A team of experts is available for individual support all around the world.



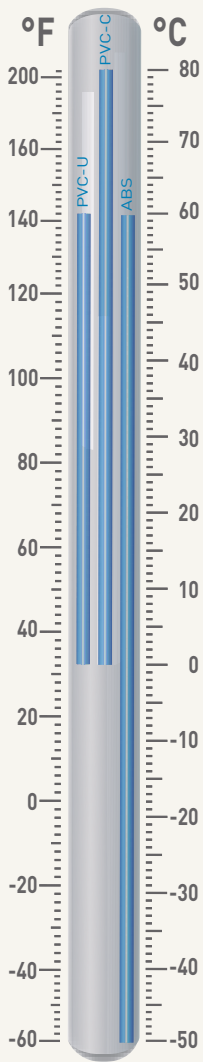
Pipes



Fittings



Valves



### PVC-U System (0 °C to +60 °C)

The universal character of PVC-U and its excellent chemical and corrosion resistance offer numerous fields of application. The system is widely used in the chemical and textile industry, in water treatment processes, for drinking water applications and vacuum lines.



### PVC-C System (0 °C to +80 °C)

The corrosion-resistant system has a long service life and a high safety factor in aggressive or corrosive environments. PVC-C systems are in use wherever aggressive media such as mixed acid waste or acids at a high temperature are transported, for example, in the chemical, paper and pulp industry or in metal treatment and microelectronic production.



### ABS System (-50 °C to +60 °C)

ABS systems offer an energy efficient solution for industrial low temperature applications, refrigeration and cooling systems. The high impact resistance even at low temperatures and the low heat conductivity support its use in cold and climate-controlled areas.



#### Technical documentation

Our extensive know-how of more than 50 years is fully documented in detail in our technical manuals, planning fundamentals and application guides.

#### Chemical resistance

In the area of chemical resistance our specialist teams offer individual support and advice in selecting the right material for the corresponding requirements.

#### Online and mobile calculation tools

Our numerous online and mobile calculation tools - available in ten languages - support our customers in configuring and commissioning automation products.

#### CAD library

The extensive CAD library is the most frequently used planning tool. The freely available database comprises over 30 000 drawings as well as technical data for our customers. Many formats are available.

#### Training courses and on-site training

GF Piping Systems offers a wide range of training courses that allow participants to gain confidence in working with our products and the proven jointing technologies.

#### System lifetime warranty \*

Confirming confidence in the premium quality of our PVC-U product and system range, we grant a limited system lifetime warranty.



Automation



Jointing technology



Customizing and training

\* Detailed information regarding the warranty can be found under: [www.gfps.com](http://www.gfps.com) - Planning fundamentals

## System range

# More than a system

We are committed to absolute conformity to standards and material approvals in diverse areas of application. Covering all requirements of the most significant international standards - as stated below - proves the quality, safety and reliability of our products. Therefore, with our cemented system range, our customers can be assured that their needs are covered and comply with most applicable standards.

**Standards \*: ISO, EN, ASTM, JIS, BS, CE, RoHS, DIN, DVS**

### Metric range

Products	bar	d																											
		DN	bar	6	8	10	12	16	20	25	32	40	50	63	75	90	110	125	140	160	180	200	225	250	280	315	355	400	
Pipes	PN6-16																												
Fittings	PN6-16																												
Ball Valves	PN6-16																												
Butterfly Valves	PN6-10																												
Check Valves	PN6-16																												
Diaphragm Valves	PN6-16																												
Flanges	PN6-16																												
Gaskets & Pipe Clips	PN16																												
Sensors & Controllers (P, T, pH, flow, analytical)	-																												

### British standard range

Products	bar	d																											
		DN	bar	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10-16"											
Pipes	PN9-15																												
Fittings	PN9-15																												
Ball Valves	PN16																												
Butterfly Valves	PN10																												
Check Valves	PN6-16																												
Diaphragm Valves	PN6-16																												
Flanges	PN10-16																												
Gaskets & Pipe Clips	PN16																												
Sensors & Controllers (P, T, pH, flow, analytical)	-																												

■ PVC-U system  
■ PVC-C system  
■ ABS system

### Approvals \*:



\* The most significant standards and approvals are shown above. An overview of all approvals online: [www.gfps.com](http://www.gfps.com)

## Chemical resistance

# For your operational safety

Our special teams offer individual support and advice in selecting the right material of inner pipe for the corresponding requirements.

### Chemical resistance at 20 °C

(Applications can be very dependent on the concentration)

		Amorphous thermoplastics	
		PVC-U	PVC-C
<b>Oxidizing Acids</b> (HNO <sub>3</sub> , H <sub>2</sub> CrO <sub>4</sub> , H <sub>2</sub> SO <sub>4</sub> , etc.)	HNO <sub>3</sub> ≤ 25 %	+	+
	25 % ≤ HNO <sub>3</sub> ≤ 65 %	o	+
	H <sub>2</sub> CrO <sub>4</sub> aqueous solution	o	o
	H <sub>2</sub> SO <sub>4</sub> ≤ 70 %	+	+
	70 % ≤ H <sub>2</sub> SO <sub>4</sub> ≤ 96 %	+	+
<b>Non Oxidizing Acids</b> (HCl, HF, etc.)	HCl ≤ 30 %	+	+
	HF ≤ 40 %	+	-
	40 % ≤ HF ≤ 75 %	-	-
<b>Organic</b> (formic acid, acetic acid, citric acid, etc.)	HCOOH ≤ 25 %	+	+
	25 % ≤ HCOOH ≤ 50 %	+	-
	CH <sub>3</sub> COOH ≤ 50 %	+	o
	50 % ≤ CH <sub>3</sub> COOH ≤ tech. pure	o	-
	C <sub>3</sub> H <sub>4</sub> OH (COOH) <sub>3</sub>	+	+
<b>Bases</b>	Inorganic (NaOH, KOH, etc.)	+	o
	Organic (amine, imidazole, etc.)	o	-
<b>Salts</b>	NaCl, FeCl <sub>2</sub> , FeCl <sub>3</sub> , CaCl <sub>2</sub> , etc.	+	+
<b>Halogens</b>	Chlorine, bromine, iodine, (no fluorine)	o	o
<b>Fuels / Oils</b>	Aliphatic hydrocarbons	+	o
	Aromatic hydrocarbons	-	-
	Chlorinated hydrocarbons	-	-
<b>Solvents</b>	Ketones	-	-
	Alcohols	o	-
	Esters	-	-
	Aldehydes	-	-
	<b>Phenols</b>	Phenol, Kresol, etc.	-
<b>Oxidizing agents</b>	NaOCl, ozone, etc.	o	o

+ resistant   o conditionally resistant, please consult us   - not resistant

The ABS material used by GF is chemically resistant against a wide range of cooling media based on glycols and aqueous solutions of alkali metal formates and acetates. Due to the individual chemical composition of the commercial products used as cooling media please contact GF (chem@georgfischer.com) for detailed advice. For additional information, please check the GF Online Tools: ChemRes and Cooling Calculation Tool.

Please note: The above list is only intended as a guideline and does not replace an in-depth review of material suitability for the particular application. The information is based on our experience and is state of the art. These data are general indicators only. In practice, however, other factors such as concentration, pressure and jointing technology must also be taken into consideration. The technical data are not binding and are not expressly warranted characteristics of the goods. Please contact us for help in selecting the right materials.

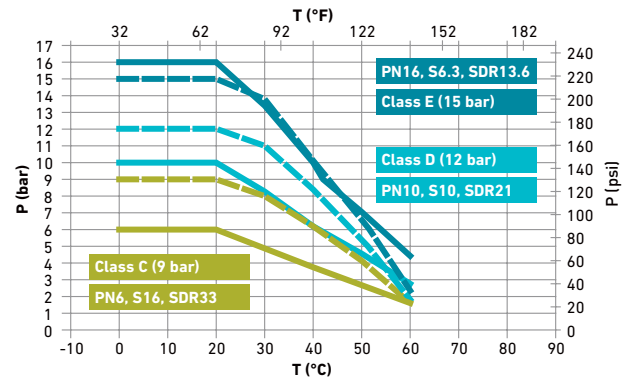
# Exceeding quality standards

## Pressure-temperature diagram and further system specifications

### PVC-U (Metric + British standard)

PVC-U shows very good characteristics in the temperature range from 0-60 °C. Ensuring highest possible thermal stability and chemical resistance PVC-U systems stand up to the most demanding conditions, particularly where media such as acids, bases and salts are transported. The universal solution covers all aspects of safety, efficiency and reliability required to build, maintain and operate industrial piping systems.

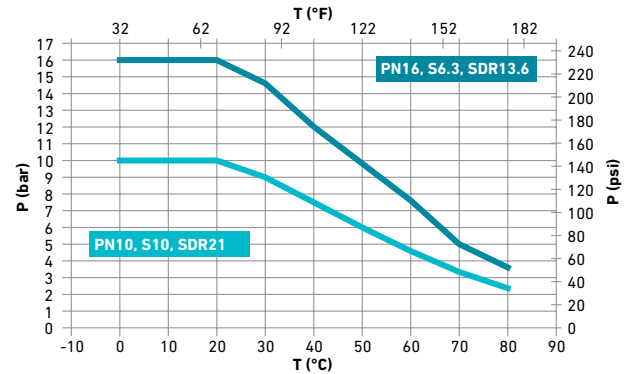
Pressure-temperature diagram



### PVC-C (Metric standard)

PVC-C piping materials, having an operational temperature range from 0-80 °C, are suitable for high temperature environments. The excellent mechanical characteristics such as a high tensile strength, stiffness and impact strength are evident even at increased temperatures.

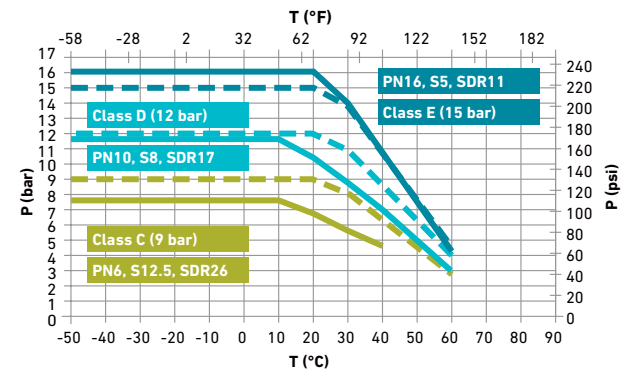
Pressure-temperature diagram



### ABS (Metric + British standard)

The outstanding characteristics of ABS allow its application in a wide temperature range between -50 °C and +60 °C. The exceptionally high notched impact strength values, even at low temperatures, indicate the material's high robustness and tolerance to surface damage.

Pressure-temperature diagram



- C** Design factor (C=2)
- P** Permissible pressure in bar, psi
- T** Temperature °C (Celsius), °F (Fahrenheit)

— Metric standard  
 - - - British standard



Where mixed chemicals and/or high or low temperature and pressure factors are added to chemical resistance factors in the use of a particular piping material, it is advisable to test the suitability of the material under the proposed temperature and pressure conditions.

Pressure-temperature diagrams of GF Piping Systems reflect the physical characteristics and properties of the different cemented systems, which have to be considered to warrant a successful operation.

Our team of experts offers individual support services to assist our customers in determining the right system selection, considering factors such as pressure, temperature and chemical resistance as well as valve maintenance cycles, sealing material and automation.



Material specifications	Cemented systems		
	PVC-U	PVC-C	ABS
<b>Systems</b>			
<b>Material</b>	Polyvinylchloride	Polyvinylchloride	Acrylnitrile-Butadien-Styrene
Colour	RAL 7011	RAL 7038	RAL 7001
Density	1.38 g / cm <sup>3</sup>	1.50 g / cm <sup>3</sup>	1.035 g / cm <sup>3</sup>
Thermal Expansion Coefficient	0.075 mm / m K	0.065 mm / m K	0.1 mm / m K
Heat conductivity at 23 °C	0.17 W / m K	0.15 W / m K	0.15 W / m K
Yield Stress at 23 °C	≥ 52 N / mm <sup>2</sup>	≥ 53 N / mm <sup>2</sup>	≥ 40 N / mm <sup>2</sup>
<b>VICAT Temperature</b>	≥ 76 °C	≥ 103 °C	≥ 94 °C
<b>Silicone Free</b>	√	√	√
<b>Drinking Water Certificates</b>	√		

More information regarding technical specifications can be found online in our planning fundamentals: [www.gfps.com](http://www.gfps.com)

# From planning to installation

Providing jointing technologies in the portfolio strengthens the integrated system approach offered by GF Piping Systems. With the invention of the cement jointing system, GF Piping Systems leads the industry in jointing technology. Today the cemented systems benefit from excellent jointing technology complemented with all the planning and preparation tools needed to successfully accomplish customers' projects. Factors such as reliability, simplicity in application, chemical resistance and the highest possible thermal stability were always emphasised and still play a major role. The cemented jointing system has proven to be reliable with over a billion joints installed. The system lifetime warranty \* on our PVC-U system warrants you peace of mind.

## Planning tools



The material selection, technical data, application area and the medium represent the key criteria in the planning process. Our customers benefit from easy access to all our planning tools.

## Preparation



The additional range of preparation tools and installation equipment ensures a safe, efficient and simple jointing process. Time saving "dry fit" installations on PVC-U are most of the time possible due to our excellence in production and tight tolerances.

## Jointing techniques



### Solvent cementing

Solvent cementing is the simplest and most efficient jointing method, suitable for almost every medium and requiring no investment in expensive equipment.



### Mechanical

Mechanical jointing is a versatile connection with a high number of removable or permanent joints for numerous applications and environments. Our range covers flanges, unions, transition fittings and special adaptors.

\* Detailed information regarding the warranty can be found under: [www.gfps.com](http://www.gfps.com) - Planning Fundamentals

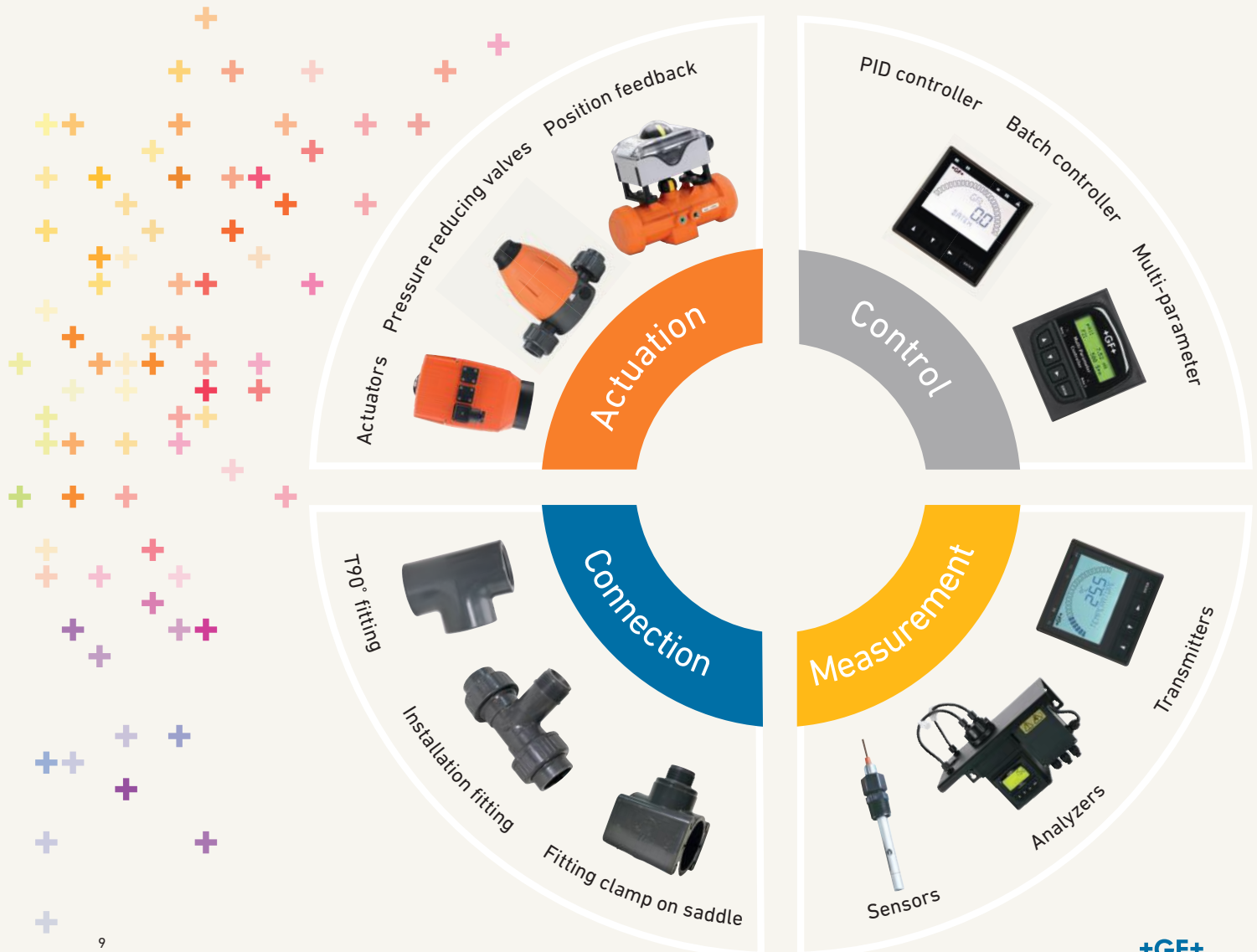


The smarter way of automation

# Automation made easy

**A unique system-based approach that bundles and integrates competencies, knowledge, best-in-class resources and technologies.**

With an innovative product portfolio in the field of measurement, control and actuation devices, GF Piping Systems follows its system approach consistently. The complete solution combines measurement, control and actuation technology together with high quality piping systems and therefore represents a unique form of product and competence bundling. The system-integrated devices that measure values such as temperature, pressure and flow deliver accuracy, productivity, reliability and safety to customers in a wide range of industries. Providing the entire range of automation technology from simple instrument panels to complex measurement installations, GF Piping Systems has not only the product resources and the technical know how, but also the global service and support infrastructure needed to meet the high customer requirements.



## Applications

# As versatile as your applications

Application-oriented systems of highest safety and reliability to fit your demanding industrial applications.



### Outstanding solutions for the microelectronics industry

PVC-U high-quality system solutions with fittings and valves warrant efficient processes with a long operational life span and a maximum of security and profitability for reliable and cost-optimized Di- or mid-range water qualities.



### Automated mixing facility for chemical process industries

Reliable PVC-U solutions for flexible mixing of chemicals complies with the respective health and safety regulations. User- and maintenance-friendly systems are the standard of GF Piping Systems.

## Key products in focus

### + Safety



#### Adapter union / Transition fittings

The adapter unions ensure a safe metal to plastic transition covering materials such as stainless steel, brass, copper or malleable iron. The innovative transition fitting is also offered with metal inserts. Leak tightness is ensured even in case of vibration and temperature fluctuations. All unions are available with male and female threads.

### + Simplicity



#### PRO-FIT Socket-spigot system

The unique socket-spigot system saves labour time, space as well as material and installation costs. Its compact design with up to 20 % closer spacing in axial distances, less cementing effort and reduced material requirements through direct transitions are big advantages that result in a maximum of efficiency.

GF Piping Systems develops customized best-in-class solutions, aligned to the specific requirements of our customers, enabling profitable operations. Most notably our systems are ideally suited for the water treatment and the chemical process industry.

With our system knowledge and product expertise, we support our customers during the planning process, the sustainable realization of the projects and provide valuable added services. Expertise in developing and producing piping systems, combined with profound industry and market knowledge, based on longstanding experience, makes GF Piping Systems a qualified and professional partner for our customers.



#### precise tank filling solutions for water treatment

Highly chemical resistant PVC-U piping system installed in a tank top construction with batch filling offers fast, precise and safe filling of tanks. A solution that provides benefits in quality, productivity and maintenance costs.



#### Water recycling in high-performance shipbuilding

PVC-U piping systems, combined with innovative measurement and control technology, provide a highly economical solution for water treatment and recycling. Chemical compatibility is warranted within the water cycle process.

## + Efficiency



#### Diaphragm valve Type 604 / 605

The full-plastic diaphragm valve 604 / 605 with integrated pneumatic actuator ensures best flow performance in compact design. With this corrosion free valve we offer an additional product with the most economic price-performance ratio which is suitable for many applications.

## + Environment



#### Cone check valve Type 561 / 562

The valve is compact, easy to install and very reliable. The wide range of products and materials, as well as the many connection options, make this valve ideal for many different applications. Installation in any orientation is possible.

# Worldwide at Home

Our sales companies and representatives ensure local customer support in over 100 countries

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